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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,457	07/01/2003	Terence J. Knowles	14247US01	1622

7590 01/26/2005
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EXAMINER

LEE, BENJAMIN C

ART UNIT PAPER NUMBER

2632

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,457

Applicant(s)

KNOWLES ET AL.

Examiner

Benjamin C. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-82 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,5-42 and 59-82 is/are allowed.
- 6) ☒ Claim(s) 1,3,4,43-53 and 55-58 is/are rejected.
- 7) ☒ Claim(s) 54 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/29/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Status

1. Claims 1-82 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 3, 4 and 43-50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1) In claim 1, lines 3-4; claim 3, lines 4-5,, claim 4, lines 10-11; claim 43, lines 4-5, “an acoustic wave cavity” should have read --said acoustic wave cavity-- if referring to its antecedence already presented in the respective claims, i.e. not different from its antecedent term.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 43-45, 47-53 and 55-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (US pat. #5,813,280).

1) Regarding claims 43 and 47-50: Johnson et al. discloses an acoustic wave resonator (Figs. 1-3) comprising: an acoustic wave cavity (section 101) formed in a substrate (“cylindrical

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body” as a whole) and defined by an area of increased mass (Fig. 2); a plurality of transducers positioned adjacent an acoustic wave cavity (Figs. 3a & 3b); a driving circuitry coupled to the transducers, the driving circuitry driving a first set of transducers to generate a first acoustic wave in the acoustic wave cavity and the driving circuitry driving a second set of the transducers to generate a second acoustic wave in the cavity (see disclosure of Figs. 3a-3b, 4 and 5a-5b); the first and second set of transducers are different, at least one of the transducers in the first set is not in the second set and at least one of the transducers in the second set is not in the first set (Figs. 3a-3b); wherein the polarity of at least one of the transducers in the first set is different from that of the transducers in the second set (by different orientations of the transducers in Figs. 3a-3b); whereby: The two resonator modes (flexural and torsional) with respect to the two set of transducers of Figs. 3a-3b are further combined in a single embodiment in Fig. 4 and col. 9, line 46 to col. 10, line 28, without specifying that the driving circuitry is in the form of the claimed controller. However, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to implement the driving circuitry of Johnson et al. using a controller.

2) Regarding claim 44, the claimed wherein at least one of the transducers is centered on a centerline of the acoustic wave cavity is met in Figs. 3a & 4 of Johnson et al.

3) Regarding claim 45, the claimed wherein at least one of the transducers is positioned off center with respect to a centerline of the cavity is met in Figs. 3b & 4 of Johnson et al.

4) Regarding claims 51-53 and 55-58, Johnson et al. render obvious all of the claimed subject matter as in the consideration of claims 43-45 and 47-50 above, wherein:

--the claimed first and second events are stress/forces acted upon the resonator.

Allowable Subject Matter

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6. Claims 2, 5-42 and 59-82 are allowed.
7. Claims 1 and 3-4 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.
8. Claim 46 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
9. Claim 54 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter:

The term “acoustic wave cavity” appearing in all of the claims has been specifically defined in the specification as a structure having an area of increased mass allowing trapping/resonance of acoustic wave(s) in the acoustic wave cavity (see, e.g. page 9 of the disclosure). As such, its structure allows for the inherent nature/degree of the acoustic wave characteristics and their interaction with substances for detection on a surface of the cavity to be different from prior art acoustic wave resonators/sensors of different structure, such as resonators/sensors utilizing acoustic waves traveling in a plate or those without the increased mass area conducive to acoustic wave trapping/resonance. While use of shear waves and compression/flexural acoustic waves for detection of ice and water are known in the art and there are suggestions of using torsional acoustic waves for substance detection and to prevent interference with other types of acoustic waves coexisting in resonators/sensors, the claimed

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resonators/sensors having such an acoustic wave cavity in the context of the detail of the devices claimed are not taught or suggested in the prior art.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) Hsu et al., US pat. #5,095,754

--A similar acoustic ice detector using a buffer block 14.

2) Liu et al., US pat. #5,456,114

--A similar acoustic sensor of ice, temperature and other parameters.

3) Sinha, US pat. #6,286,370

--A similar acoustic cavity sensor using plate sensor distinguishing ice and water (col. 4, lines 41-59).

4) Lynnworth, US pat. #3,540,265

--A similar acoustic resonator/sensor using torsional and extensional waves.

5) Bau et al., US pat. #4,893,496

--A similar torsional wave fluid sensor and system.

6) Schugt, US pat. #5,922,958

--A similar acoustic surface-contaminant sensor.

7) Brace et al., US pat. #5,051,645

--A similar acoustic sensor distinguishing water and ice.

8) Lynnworth, US pat. #5,159,838

--A similar acoustic wave guide with various waves for parameter sensing.


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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin C. Lee whose telephone number is (571) 272-2963.

The examiner can normally be reached on Mon -Fri 11:00Am-7:30Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Benjamin C. Lee
Primary Examiner
Art Unit 2632

B.L.